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(54) **Breathing mask, particularly for sports use**

Atemmaske, insbesondere für Sportausübung  
Masque respiratoire, notamment à usage sportif

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• **PATENT ABSTRACTS OF JAPAN vol. 2003, no. 05, 12 May 2003 (2003-05-12) & JP 2003 024460 A (NEC TOKIN CORP), 28 January 2003 (2003-01-28)**

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## Description

**[0001]** The present invention relates to a breathing mask, particularly for use in sports, of the kind defined in the preamble of claim 1.

**[0002]** FR-923954-A discloses a breathing mask arrangement of this kind including two box-like tubes which in use extend parallel to one another in respective vertical directions, from the shell. Inside each of said tubes there are arranged respective pluralities of stacked blades forming one-way end flap valves, alternately for the air sucked into the mask and for the air exhausted from the mask, respectively. The said tubes are attached to the shell, but the assembly formed by the shell and the tubes is separate and distinct from the annular band which is used to keep said assembly in place and for encircling the neck and the lower portion of the head of the user.

**[0003]** It is an object of the invention to provide an improved breathing mask that will protect the nose, the mouth and the initial airways when engaged in various sports activities in cold climates, yet allow easy breathing.

**[0004]** This and other objects are achieved according to the invention with a breathing mask as defined in claim 1.

**[0005]** Other features and advantages of the invention, and many different embodiments thereof, will be shown in the following detailed description, given purely by way of non-restrictive example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a breathing mask according to the invention;

Figure 2 is a perspective view showing a shell for a mask according to the invention applied around the nose and mouth of a user;

Figure 3 is a partial view in section on the plane marked III-III in Figure 1; and

Figure 4 is a side view of a breathing mask as shown in Figure 1 as worn by a user.

**[0006]** In Figure 1 the numeral 1 is a general reference for a breathing mask according to the invention.

**[0007]** The mask 1 comprises an annular band 2 of flexible material, its dimensions enabling it to encircle the neck and at least the lower part of the head of the user, covering the nose and mouth in particular. The band 2 may optionally extend sufficiently to also cover the user's ears, or may be incorporated into a head covering or so-called "balaclava".

**[0008]** The band 2 may be made of woven or nonwoven materials, preferably thermally insulating, lightweight, wind-resistant, at least partly breathable, and optionally elastic or elastically. Examples of suitable materials are for instance the materials marketed under the registered trade marks Polartec, Powershield, Windpro and Windbloc, all produced by the United States company Malden Mills, or under the registered trade marks GoreTex or Windstopper, both produced by the United

States company W. L. Gore.

**[0009]** Although with a suitable design and the adoption of elastic or elastically materials the band 2 can easily be adapted to the characteristics of different users, some means of adjustment may conveniently be provided, such as a drawcord 3 in tunnels 4 near the upper edge of the band. In the illustrative embodiment shown in Figure 1 the drawcord 3 forms a main loop 3a designed to pass over the head of a user (see Figure 4). At the back of the band 2 the part of the drawcord 3 that emerges from the tunnels 4 is provided with a cord stop device 5 of a sort known per se.

**[0010]** A particular feature of the version described above is that it prevents the mask slipping down the user's head during more intense sporting activities.

**[0011]** Attached to the inside of the front part of the band 2 is a shell 6 (Figures 2 and 3) of a material which by comparison is slightly stiffer. The concavity of this shell 6 is turned towards the interior of the band and its dimensions are such that it is able to accommodate the user's nose and mouth, as indicated in Figure 2.

**[0012]** In the illustrative embodiment described, the shell 6 has two approximately circular side openings 7. These openings are connected to the ends of corresponding tubes 8 which run in opposite, essentially horizontal directions towards the back of the band 2, which is intended when in use to cover the nape of the neck of the user.

**[0013]** The radius of the cross section of the tubes 8 may be for example between 20 and 50 mm. They can be made of various types of plastic or elastomeric materials, or conceivably even from the same woven or nonwoven materials as the band 2.

**[0014]** The shell 6 and the tubes 8 may conveniently be made in one piece.

**[0015]** If the tubes 8 are not made of a sufficiently stiff material, they must be strengthened with an internal, preferably elastic and flexible structure to keep them open. Such a support structure, in the form of for example a plurality of rings 9 incorporated in the tube (Figure 1), may be produced from various types of plastic materials such as nylon, Hytel (registered trade mark) or Lexan (registered trade mark). In place of a plurality of rings, the structure designed to keep the tubes 8 open may comprise multiple flexible "sticks" inserted into corresponding pockets in the walls of the tubes 8, at right angles to the direction of these tubes.

**[0016]** An alternative way of keeping the tubes 8 open is to insert a "core" of a semi-rigid three-dimensional textile material, such as the material known as "3D-mesh", the dimensions of the meshes or cells of which must be such as to allow the passage of a substantial flow of air through the abovementioned tubes.

**[0017]** As mentioned earlier, the tubes 8 are long enough to extend to the sides of the face, to below the ears. Their length may typically be between 50 and 250 mm.

**[0018]** The wall of the band 2 that covers the front of

the shell 6 may optionally comprise one or more additional layers of insulating textile materials, in order to reduce the temperature bridge between the region inside the shell 6 and the external environment and so reduce the formation of condensation in this shell. Examples of materials suitable for this purpose are those marketed under the registered trade marks Polartec Classic and Polartec Thermal Pro, both produced by Malden Mills (USA).

**[0019]** It is useful to have the upper edge of the mask 1, in particular the front, shaped to cover the nose without obstructing the vision. The shaping of this edge must be compatible with the use of protective goggles. The front of the mask around the upper portion of the edge of the shell 6 may incorporate plates or sticks of metallic materials or shape-memory polymeric materials that can be moulded to the shape of the user's nose in order to get a better seal between the mask and the perinasal region of the user. This will also prevent fogging of goggles, if worn by the user. Alternatively, the front portion of the mask 2 may incorporate, for the same reasons, a sheet of shape-memory polymer material, in solid or expanded form, capable of moulding itself under the effect of the temperature of the body, and thereafter capable of retaining the impression of the user's face.

**[0020]** The breathing mask described above is particularly indicated for use in sports such as racing, skating, cross-country skiing and downhill skiing, snowboarding, cycling and motorcycling, especially in their winter forms.

**[0021]** With reference to Figure 4, the use of the mask gives efficient frontal wind protection and allows the user to breath only "calm", partially preheated air.

**[0022]** The version described, which uses a single cord pull 3 is particularly practical because it can be used for both height and width adjustment.

**[0023]** In alternative embodiments (not shown), a mask according to the invention may comprise a portion including the shell 6 and the associated tubes 8 with connecting means (e.g. press studs or microhook-type connecting elements) for connecting it to the lower/rear portion of a head covering. This portion, which includes the shell 6, can be connected to the head covering along essentially vertical connecting lines. As an alternative, the said portion of the mask may be an annular band suitable for encircling the user's neck and able to be connected to the lower/rear border of a head covering, along an essentially horizontal connecting line.

**[0024]** Clearly, provided the principle of the innovation is retained, the forms of embodiment and the details of manufacture may vary greatly from what has been described and illustrated purely by way of non-restrictive example, without thereby departing from the scope of the invention as defined in the accompanying claims.

## Claims

1. Breathing mask (1), particularly for sports use, com-

prising

an annular band (2) of flexible material, its dimensions enabling it to encircle the neck and at least a lower portion of the head of a user,

a shell (6) connected to the band (2), its concavity towards the interior of the said band (2), and its dimensions such that it is able to accommodate the user's nose and mouth, and

two tubes (8) extending each from an opening (7) formed in the said shell (6) to a region remote from the shell (6), in such a way that during use the user inhales air from the said region through the said tubes (8);

the breathing mask being **characterized in that** the said tubes (8) extend in opposite, essentially horizontal directions from the two openings (7) and are attached to the outer surface of the band (2); said tubes (8) extending towards the back of the band (2), to the sides of the face, to the region below the ears of the user.

2. Breathing mask according to Claim 1, in which the band (2) may extend sufficiently to also covering the user's ears.

3. Breathing mask according to Claim 1 or 2, in which the band (2) is incorporated into a head covering such as a so-called balaclava.

4. Breathing mask according to Claim 1 or 2, in which the said annular band (2) is provided with connecting means adapted to connect it to the lower/rear portion of a head covering.

5. Breathing mask according to any one of the preceding claims, in which the band (2) is provided with at least one cord element (3) forming at least one upper loop (3a) so that it can pass over the head of the user, following an essentially meridian line.

6. Breathing mask according to Claim 5, in which the said cord element (3) is provided with a cord stop device (5) for fastening it in a tightened condition on the user's head.

7. Breathing mask according to any one of the preceding claims, in which the said tubes (8; 8') are provided with reinforcing means (9) adapted to preventing them from collapsing and for keeping them open.

8. Breathing mask according to any one of the preceding claims, the front portion of which is provided with one or more elements made from a shape-memory material.

9. Breathing mask according to any one of the preceding claims, in which the shell (6) and the said tubes (8) are made in one piece.

## Patentansprüche

1. Atemmaske (1), insbesondere zur Sportausübung, umfassend  
ein ringförmiges Band (2) aus flexiblem Material, dessen Dimensionierung es in die Lage versetzt, den Hals und zumindest einen unteren Kopfabchnitt des Benutzers zu umfassen,  
eine mit dem Band (2) verbundene Hülle (6), deren in die Innenseite des Bandes (2) gerichtete Höhlung und Dimensionierung derart gestaltet sind, dass sie in der Lage ist, Nase und Mund des Benutzers aufzunehmen, und  
zwei Schläuche (8), die sich jeweils von einer in genannter Hülle (6) ausgebildeten Öffnung (7) in eine von der Hülle (6) entfernte Region erstrecken, und zwar derart, dass der Benutzer während der Benutzung Luft aus der genannten Region durch die genannten Schläuche (8) einatmet; wobei die Atemmaske **dadurch gekennzeichnet ist, dass** die Schläuche (8) sich in im Wesentlichen horizontale entgegengesetzte Richtungen von den zwei Öffnungen (7) erstrecken und an der Außenfläche des Bandes (2) befestigt sind; wobei genannte Schläuche (8) sich zur Rückseite des Bandes (2), zu den Seiten des Gesichtes, zur Region unter den Ohren des Benutzers erstrecken.
2. Atemmaske gemäß Anspruch 1, worin das Band (2) sich ausreichend ausdehnen kann, um auch die Ohren des Benutzers zu bedecken.
3. Atemmaske gemäß Anspruch 1 oder 2, worin das Band (2) in einem Kopfschutz wie etwa einer sogenannten Balaklava aufgenommen ist.
4. Atemmaske gemäß Anspruch 1 oder 2, worin genanntes ringförmiges Band (2) mit Verbindungsmitteln versehen ist, die dazu angepasst sind, dieses mit dem unteren/hinteren Abschnitt eines Kopfschutzes zu verbinden.
5. Atemmaske gemäß einem der vorstehenden Ansprüche, worin das Band (2) mit zumindest einem Schnurelement (3) versehen ist, das zumindest eine obere Schlaufe (3a) bildet, so dass es über den Kopf des Benutzers, folgend einer im Wesentlichen Meridianlinie, gezogen kann.
6. Atemmaske gemäß Anspruch 5, worin genanntes Schnurelement (3) mit einer Schnurarretiervorrichtung (5) versehen ist, um diese in einem angezogenen Zustand auf dem Kopf des Benutzers zu befestigen.
7. Atemmaske gemäß einem der vorstehenden Ansprüche, worin genannte Schläuche (8; 8') mit Verstärkungsmitteln (9) versehen sind, die dazu ange-

passt sind, zu verhindern, dass sie zusammenfallen, und um sie geöffnet zu halten.

8. Atemmaske gemäß einem der vorstehenden Ansprüche, wobei der vordere Abschnitt dieser mit einem oder mehreren Elementen aus einem Formgedächtnismaterial gefertigt ist.
9. Atemmaske gemäß einem der vorstehenden Ansprüche, wobei die Hülle (6) und die genannten Schläuche (8) einstückig ausgeführt sind.

## Revendications

1. Masque respiratoire (1), notamment à usage sportif, comprenant une bande annulaire (2) en matériau flexible, ses dimensions lui permettant d'encercler le cou et au moins une partie inférieure de la tête d'un utilisateur,  
une coque (6) reliée à la bande (2), sa concavité vers l'intérieur de ladite bande (2) et ses dimensions lui permettant de loger le nez et la bouche de l'utilisateur, et  
deux tubes (8) s'étendant chacun à partir d'une ouverture (7) formée dans ladite coque (6) vers une région distante de la coque (6), de telle manière que pendant l'utilisation l'utilisateur inhale de l'air à partir de ladite région à travers lesdits tubes (8) ;  
le masque respiratoire étant **caractérisé en ce que** lesdits tubes (8) s'étendent dans des directions opposées essentiellement horizontales par rapport aux deux ouvertures (7) et sont fixés à la surface extérieure de la bande (2) ; lesdits tubes (8) s'étendant vers l'arrière de la bande (2), vers les côtés de la face, vers la région en dessous des oreilles de l'utilisateur.
2. Masque respiratoire selon la revendication 1, dans lequel la bande (2) peut s'étendre suffisamment pour couvrir également les oreilles de l'utilisateur.
3. Masque respiratoire selon la revendication 1 ou 2, dans lequel la bande (2) est incorporée dans un bonnet tel qu'un dénommé passe-montagne.
4. Masque respiratoire selon la revendication 1 ou 2, dans lequel ladite bande annulaire (2) est dotée de moyens de liaison conçus pour la relier à la partie inférieure/arrière d'un bonnet.
5. Masque respiratoire selon l'une quelconque des revendications précédentes, dans lequel la bande (2) est dotée d'au moins un élément de cordon (3) formant au moins une boucle supérieure (3a) de sorte qu'il puisse passer au-dessus de la tête de l'utilisateur, en suivant une ligne essentiellement méridienne.

6. Masque respiratoire selon la revendication 5, dans lequel ledit élément de cordon (3) est pourvu d'un dispositif d'arrêt de cordon (5) permettant de le fixer dans un état serré sur la tête de l'utilisateur. 5
7. Masque respiratoire selon l'une quelconque des revendications précédentes, dans lequel lesdits tubes (8 ; 8') sont dotés de moyens de renfort (9) conçus pour empêcher leur écrasement et pour les maintenir ouverts. 10
8. Masque respiratoire selon l'une quelconque des revendications précédentes, dont la partie frontale est dotée d'un ou plusieurs éléments fabriqués à partir d'un matériau à mémoire de forme. 15
9. Masque respiratoire selon l'une quelconque des revendications précédentes, dans lequel la coque (6) et lesdits tubes (8) sont fabriqués en une seule pièce. 20

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FIG.1

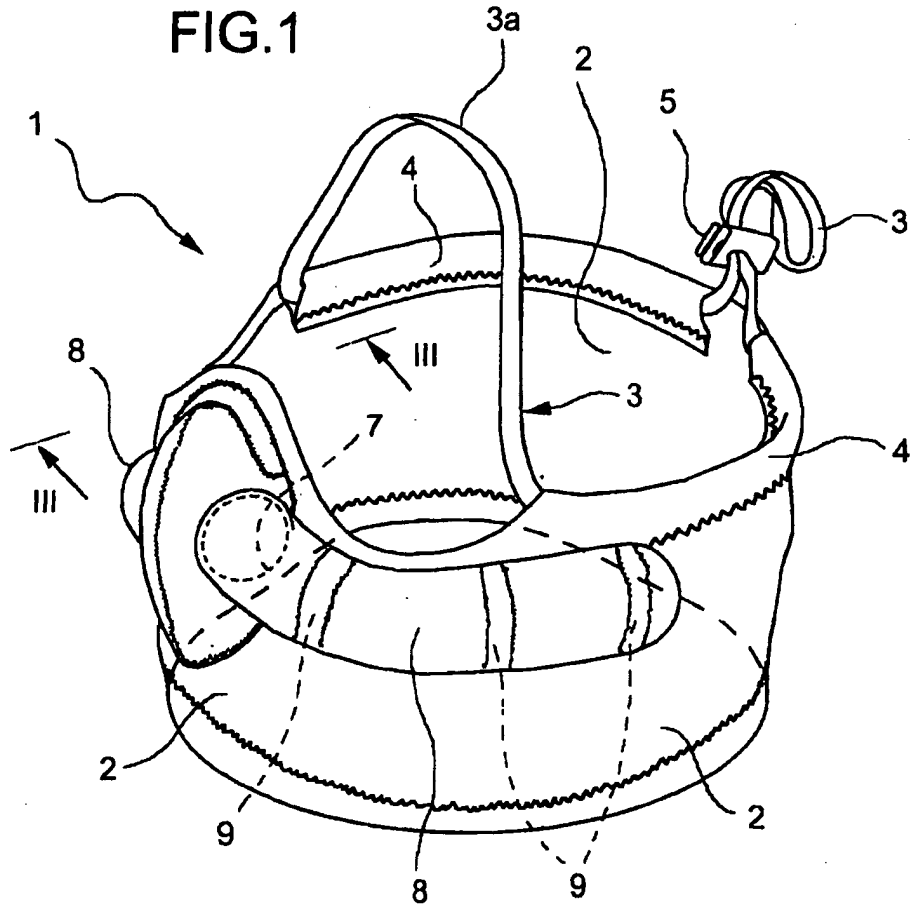


FIG.2

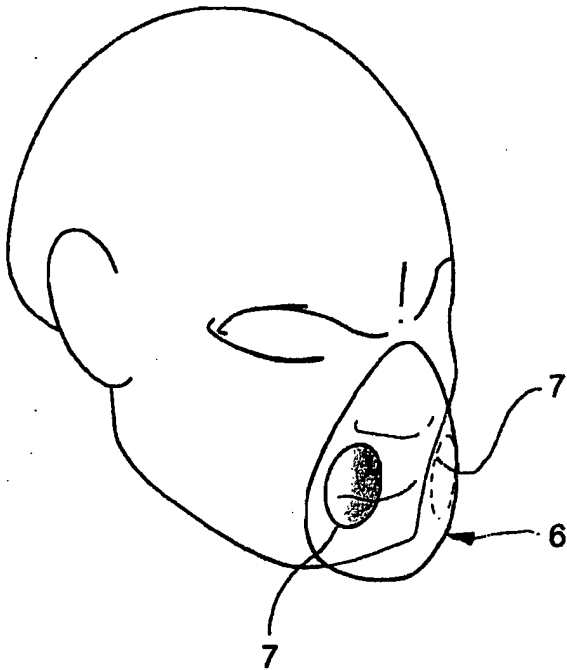


FIG.3

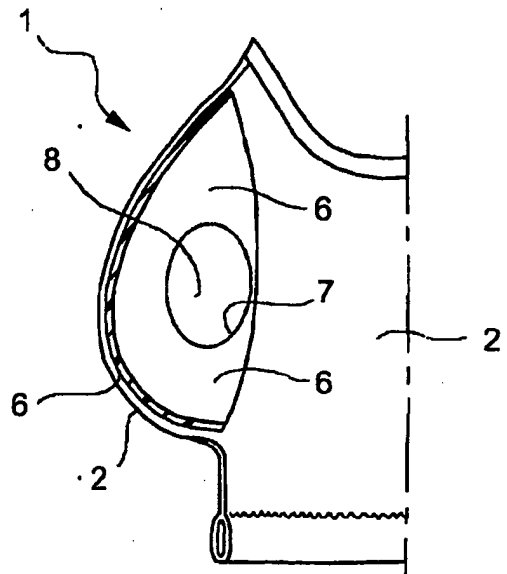
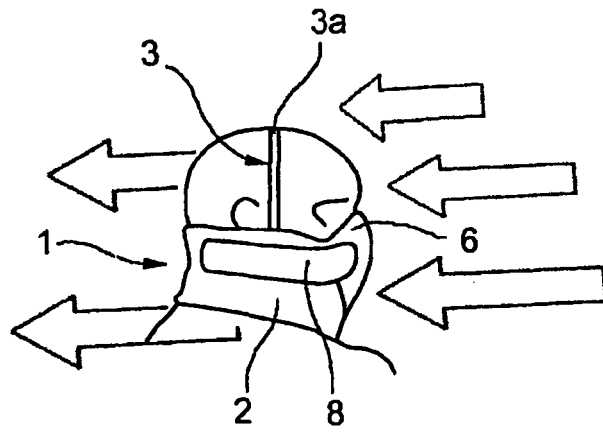


FIG.4



**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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